THE VARIATION EXHIBITED BY MAINLAND AND ISLAND SPECIMENS OF THE HIBAKARI SNAKE, NATRIX VIBAKARI (BOIE).

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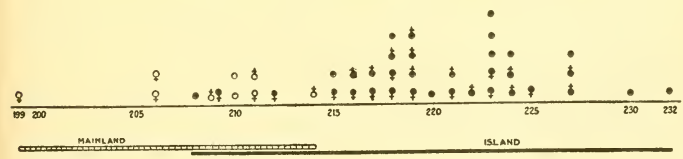
In a recent paper[1] attention was called to the fact, first made known by Wallace, that where a serpent inhabits both the mainland and adjoining islands individuals captured on the islands frequently possess the larger number of vertebræ. This has been examined into and found to hold true for a great many species, including members of the Colubridæ, Najidæ, and Crotalidæ. An endeavor is being made to ascertain exactly which portion of the vertebral column becomes involved in the process of lengthening. In the present species it is the caudal region alone.

The island specimens of *Natrix vibakari* (Boie) have been reported from Hondo, Shikoku, and Kiushu, three of the four principal islands of Japan. None have been reported from Hokkaido, the northern island. The mainland specimens have been captured at Khabarovka, Vladivostok, and Possiet Bay in the Ussuri Province of Siberia, and from Fusan in southeast Korea.

If the sum of the gastrosteges and the urosteges in each specimen be plotted in linear fashion, it may be seen at a glance that the examples from the islands have the larger number of vertebræ.

Diagram showing the variation in the sum of the ventrals and subcaudals.



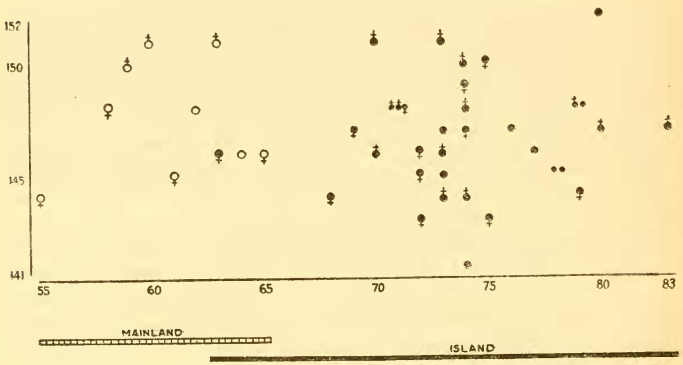
In the above diagram the circles represent mainland and the dots island specimens. Where the sex has been recorded, there is added the conventional sign.

[1] Herpetological Notices, No. 3, San Francisco.

Range of variation in 44 specimens	199–232
Range in 9 mainland specimens	199–214
Arithmetical mean	208
Range in 35 island specimens	208–232
Arithmetical mean	221
Overlapping of mainland and island specimens:	
In terms of shields	7
In percentage of the total range	21

A more instructive graphic scheme will result if the records of each specimen be plotted on squared paper, due regard being taken of the gastrostege and urostege count.

Diagram showing the variation in the subcaudals.



Range of variation in 43 specimens:	
Ventrals	141–152
Subcaudals	55– 83
Range in 9 mainland specimens:	
Ventrals	144–151
Subcaudals	55– 65
Range in 34 island specimens:	
Ventrals	141–152
Subcaudals	63– 83
Overlapping of mainland and island specimens:	
Ventrals (range 12, overlapping 8) per cent..	66. 6
Subcaudals (range 29, overlapping 3) do....	10. 3

The variation in the number of dorsal vertebræ, as evidenced by the gastrostege count, is seemingly of no consequence. As to the caudal vertebræ, however, it is most apparent that the specimens from the two geographical regions are in this respect quite distinct. Furthermore, owing to the fact that a straightforward species is under consideration, occasional intermediates between the two groups exist.

The climate of continental islands is regularly milder than that of the adjoining mainland of the same latitude. Where the range of a species extends over regions that differ, in one having a more temperate climate, the animals inhabiting the warmer are prone to be the larger. The lengthening of the tail in this species is evidently an example of this phenomenon.

The increase in the length of the vertebral column has been confined strictly to the caudal region. There has been no change in the relative position of the internal organs. The gastrostege level at which the principal viscera are situated may be presented in a table.

Gastrostege level of the principal viscera.

	Mainland.				Island.								
Sex	♂	♀	♀	♀	♂	♂	♂	♂	♂	♀	♀	♀	♀
Gastrosteges	151	144	145	146	144	144	145	146	148	143	143	143	147
Heart, apex	29	27	26	27	30	28	30	30	28	28	26	26	29
Liver:													
Anterior	41	36	35	35	37	37	37	38	36	36	35	35	36
Posterior	78	75	74	74	70	74	78	77	73	69	74	72	64
Gall bladder, middle	85	82	85	84	83	80	82	83	84	.....	84	85	76
Kidneys, right:													
Anterior	115	115	.....	.....	.....	110	112	114	112	.....	119	110	119
Posterior	127	125	.....	.....	.....	125	125	127	124	.....	130	121	128
Kidneys, left:													
Anterior	123	120	.....	.....	.....	119	122	123	117	.....	123	119	126
Posterior	137	132	.....	.....	.....	134	136	137	131	.....	133	130	137
Ileo-cæcal valve	131	128	.....	.....	.....	123	128	127	.....	.....	128	123	128
Cal. Ac. Sci. Mus. No.	31487	31488	31486	31485	15854	16085	15860	15859	15856	15855	15858	15857	15861

An inspection of this table brings to light the fact that where one specimen has a few more body vertebræ than another the increase has taken place in a definite part of the column. This region is between the gall bladder and the ileo-cæcal valve, and would correspond to the lumbar region in the higher animals.

The scales are in 19 rows anteriorly and 17 posteriorly; the IV row is the one that is suppressed, and it terminates at the upper half of an enlarged scale in the row below.

Gastrostege level at which the suppressed rows terminate.

	Mainland.				Island.								
Sex	♂	♀	♀	♀	♂	♂	♂	♂	♂	♀	♀	♀	♀
Gastrosteges	151	144	145	146	144	144	145	146	148	143	143	143	147
19 rows anterior IV suppressed:													
Right	70	86	79	84	78	84	85	84	83	73	83	76	86
Left	66	88	79	84	79	82	86	83	84	75	82	80	V 91
17 rows posteriorly	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cal. Ac. Sci. Mus. No.	31487	31488	31486	31485	15854	16085	15860	15859	15856	15855	15858	15857	15861

At present there are only a few records of mainland specimens but these are sufficient to show that there exists a marked tendency toward a reduction in the number of head shields. The island

specimens normally have three postoculars, whereas those from the mainland as a rule have two. The island examples normally have 7 supralabials, and where they vary it is in the direction of an increased number, or 8. Those from the mainland normally have 7 also, but when they vary it is in the direction of a reduced number, or 6.

The nearest ally of this serpent is *Natrix sauteri* (Boulenger), from Formosa. There are no records of either from the intervening Riu Kiu Islands.

The material upon which this study was based consists of 20 specimens in the United States National Museum, 8 in the British Museum of Natural History, 12 in the California Academy of Sciences, and 6 records from literature.